ELECTRONICS TECHNICIAN-VOLUME 1

SAFETY

NAVEDTRA 12411-A

Prepared by the Naval Education and Training Professional Development and Technology Center (NETPDTC), Pensacola, Florida

Congratulations! By enrolling in this course, you have demonstrated a desire to improve yourself and the Navy. Remember, however, this self-study course is only one part of the total Navy training program. Practical experience, schools, selected reading, and your desire to succeed are also necessary to successfully round out a fully meaningful training program. You have taken an important step in self-improvement. Keep up the good work.

HOW TO COMPLETE THIS COURSE SUCCESSFULLY

<u>ERRATA</u>: If an errata comes with this course, make all indicated changes or corrections before you start any assignment. Do not change or correct the associated text or assignments in any other way.

ASSIGNMENTS: The text pages that you are to study are listed at the beginning of each assignment. Study these pages carefully before attempting to answer the questions in the course. Pay close attention to tables and illustrations because they contain information that will help you understand the text. Read the learning objectives provided in the text and/or preceding each set of questions in the course. Learning objectives state what you should be able to do after studying the material. Answering the questions correctly helps you accomplish the objectives.

SELECTING YOUR ANSWERS: After studying the associated text, you should be ready to answer the questions in the assignment. Read each question carefully, then select the BEST answer. Be sure to select your answer from the subject matter in the text. You may refer freely to the text and seek advice and information from others on problems that may arise in the course. However, the answers must be the result of your own work and decisions. You are prohibited from referring to or copying the answers of others and from giving answers to anyone else taking the same course.

Failure to follow these rules can result in suspension from the course and disciplinary action.

ANSWER SHEETS: You must use answer sheets designed for this course (NAVEDTRA Form 1430/5, Stock Ordering Number 0502-LP-216-0100). Use the answer sheets provided by Educational Services Officer (ESO), or you may reproduce the one in the back of this course booklet.

SUBMITTING COMPLETED ANSWER SHEETS: As a minimum, you should complete at least one assignment per month. Failure to meet this requirement could result in disenrollment from the course. As you complete each assignment, submit the completed answer sheet to your ESO for grading. You may submit more than one answer sheet at a time.

GRADING: Your ESO will grade each answer sheet and notify you of any incorrect answers. The passing score for each assignment is 3.2. If you receive less than 3.2 on any assignment, your ESO will list the questions you answered incorrectly and give you an answer sheet marked "RESUBMIT." You must redo the assignment and complete the RESUBMIT answer sheet. The maximum score you can receive for a resubmitted assignment is 3.2.

<u>COURSE COMPLETION:</u> After you have submitted all the answer sheets and have earned at

least 3.2 on each assignment, your command should give you credit for this course by making the appropriate entry in your service record.

NAVAL RESERVE RETIREMENT CREDIT: If you are a member of the Naval Reserve, you will receive retirement points if you are authorized to receive them under current directives governing retirement of Naval Reserve personnel. For Naval Reserve retirement, this course is evaluated at 2 points. (Refer to BUPERSINST 1001.39 for more information about retirement points.)

STUDENT QUESTIONS: If you have questions concerning the administration of this course, consult your ESO. If you have questions on course content, you may contact NETPDTC at:

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COURSE OBJECTIVES: After completing this course, you should be able to: Discuss the primary causes of mishaps and methods for preventing mishaps; Identify the safety related responsibilities of the typical chain of command, from the commanding officer down to the individual worker; State the minimum information required to be listed on a hazardous materials label; Explain the general requirements and restrictions associated with purchasing, storing, handling, using, and disposing of hazardous materials; State specific requirements and restrictions associated with purchasing, storing, handling, using, and disposing of solvents, aerosol containers, PCBs, batteries, vacuum tubes, and cathode-ray tubes; Explain the effects of electric shock on the human body and state the methods of preventing electric shock; Identify the primary sources of hazardous electromagnetic radiation and the effects on the human body; State the purpose of the tag-out bill and the personnel responsibilities, documents, and procedures associated with tag-out; and Identify and state the purpose of the primary safety equipment associated with Electronics Technicians.

Naval courses may include several types of questions--multiple-choice, true-false, matching, etc. The questions are not grouped by type but by subject matter. They are presented in the same general sequence as the textbook material upon which they are based. This presentation is designed to preserve continuity of thought, permitting step-by-step development of ideas. Not all courses use all of the types of questions available. You can readily identify the type of each question, and the action required, by reviewing of the samples given below.

MULTIPLE-CHOICE QUESTIONS

Each question contains several alternative answers, one of which is the best answer to the question. Select the best alternative, and blacken the appropriate box on the answer sheet.

SAMPLE

- s-1. The first U.S. Navy nuclear-powered vessel was what type of ship?
 - 1. Carrier
 - 2. Submarine
 - 3. Destroyer
 - 4. Cruiser

Indicate in this way on your answer sheet:

	1	2	3	4
	T	F		
s-1				o

TRUE-FALSE OUESTIONS

Mark each statement true or false as indicated below. If any part of the statement is false, the entire statement is false. Make your decision, and blacken the appropriate box on the answer sheet.

SAMPLE

- s-2. Shock will never be serious enough to cause death.
 - 1. True
 - 2. False

Indicate in this way on your answer sheet:

	1	2	3	4
	T	F		
s-2				Π
į .				

MATCHING QUESTIONS

Each set of questions consists of two columns, each listing words, phrases or sentences. Your task is to select the item in column B which is the best match for the item in column A. Items in column B may be used once, more than once, or not at all. Specific instructions are given with each set of questions. Select the numbers identifying the answers and blacken the appropriate boxes on your answer sheet.

SAMPLE

In answering questions s-3 through s-6, SELECT from column B the department where the shipboard officer in column A functions. Responses may be used once, more than once,or not at all.

A. OFFICER

B. DEPARTMENT

Indicate in this way on your answer sheet:

- s-3. Damage Control Assistant
- s-4. CIC Officer
- s-5. Disbursing Officer
- s-6. Communications Officer
- 1. Operations Department
- 2. Engineering Department
- 3. Supply Department
- 4. Navigation Department

	1 T	2 F	3	4
s-3				Π
s-3 s-4 s-5 s-6				
s-5				Π
s-6				o

ASSIGNMENT 1

"Naval Safety," chapter 1, pages 1-1 through 1-9; "Hazardous Textbook Assignment: Materials, " chapter 2, pages 2-1 through 2-9; and "Electronic

Safety, " chapter 3, pages 3-1 through 3-13.

- Which of the following occurrences is/are basic to a mishap?
 - 1. A planned or intentional event
 - 2. Contact that causes injury or property damage
 - Stops or interrupts work
 - 4. Both 2 and 3 above
- In what year were safety engineers assigned to each major shipyard?
 - 1. 1917
 - 2. 1929
 - 3. 1947
 - 4. 1951
- What is/are the number one cause 1-3. of mishaps?
 - Equipment 1.
 - 2. Weather
 - Personnel 3.
 - Broken tools
- Who is the designated occupational safety and health (OSH) official for the Department of the Navy?
 - Chief of Naval Operations
 - 2. Vice Chief of Naval Operations

 - 3. Secretary of the Navy 4. Assistant Secretary of the Navv
- 1-5. Who monitors safety and occupational health statistics and provides direct support and assistance to fleet units in safety matters?
 - Chief, Bureau of Medicine and 1. Surgery
 - Chief, Naval Education and Training
 - Commander, Naval Sea Systems Command
 - 4. Commander, Naval Safety Center
- Which of the following OPNAV instructions covers the Navy Occupational Safety and Health program?
 - 5100.12 1.
 - 2. 5100.19
 - 3. 5100.21
 - 4. 5100.23

- 1-7. Of the following factors, which forms the basis of mishap prevention?
 - Mishaps are caused
 - 2. Tools are unsafe
 - 3. Training is inadequate
 - 4. Equipment is designed improperly
- 1-8. MAA/Safety Force personnel are roving inspectors for hazards that could result in injury to personnel or damage to equipment.
 - 1. True
 - 2. False
- 1-9. Hazards that may cause severe injury, severe occupational illness, or major property damage are assigned what category?
 - 1.
 - 2. II
 - 3. III
 - 4. IV
- 1-10. If you are assigned a task that is beyond your skill level, you should take which of the following actions?
 - Skim over the technical documents before starting
 - Take shortcuts to finish the task and look good to your supervisor
 - 3. Tell your supervisor and ask for assistance
 - 4. Refuse to do the work
- 1-11. There is no need to review all precautions for a task you have preformed many times before.
 - True
 - 2. False
- Behavior that leads to a mishap is usually caused by which of the 1-12. following problems?
 - Undesirable attitudes
 - 2. Lack of knowledge
 - 3. Undesirable motivations
 4. Both 1 and 3 above

- 1-13. What type of motivation can cause 1-20. When you need to delay correcting "jury-rigged" equipment?
 - 1. Motivation to gain approval
 - 2. Motivation to save time
 - 3. Motivation to maintain personal comfort
- 1-14. Which of the following are incentives for specific acts?

 - 1. Attitudes
 2. Union Unique past experiences
 Motivations
- 1-15. Which of the following is NOT a 1-21. symptom of fatique?
 - 1. Boredom
 - 2. Confusion

 - 3. Impatience4. Irritability
- pertains to a mishap probability assigned subcategory B?
 - It is likely to occur immediately
 - It will probably occur in time
 - It is unlikely to occur 3.
- Which of the following problems 1-17. can cause a communication problem and lead to a mishap?
 - 1. A breakdown in the passing of information
 - Misunderstanding information
 - 3. Language weakness 4. All of the above
- What law assures safe and 1-18. healthful working conditions for every worker in the United States?
 - The Navy Safety Program
 - The Occupational Safety and Health Act
 - 3. The Congressional Act on Safe Working Conditions
 - 4. The Consolidated Labor Union Workers' Benefits
- What is the objective of the 1-19. Navy's mishap prevention program?
 - To investigate all mishaps
 - To prevent mishaps from occurring
 - 3. To prevent mishaps from reoccurring
 - 4. Both 2 and 3

- an unsafe condition, which of the following actions should you take?
 - Take whatever temporary precaution you need to protect vourself
 - 2. Take whatever temporary precautions you need to protect yourself and your coworkers
 - 3. Send a memo to your supervisor
 - Send a memo to your division officer
- Commanding officers can delegate their responsibilities for safety of all personnel under their command to the executive officer.

 - 1. True 2. False
- 1-16. Which of the following statements 1-22. Factors that can contribute to worker caused mishaps include
 - 1. lack of experience, outdated procedures
 - negative motivation
 - medical and communication problems
 - all of the above
 - 1-23. The quantity of hazardous material stored in the work space should be limited to what amount?
 - Enough for one work shift
 Enough for one week
 Enough for one month

 - CARBON-ZINC DRY-CELL BATTERY
 - B. LITHIUM CELL BATTERY
 - MANGANESE-DIOXIDE ALKALINE-ZINC CELL BATTERY
 - D. LEAD-ACID CELL BATTERY
 - E. MERCURIC-OXIDE ZINC CELL BATTERY
 - F. NICKEL-CADMIUM CELL BATTERY

Figure 1-A.—Types of batteries

REFER TO FIGURE 1-A. MATCH THE TYPE OF BATTERY IN FIGURE 1-A WITH ITS MOST CORRECT CHARACTERISTIC(S) AND HAZARD(S) IDENTIFIED IN THE QUESTION.

- 1-24. Used in most cordless, recharge-able equipment; should not be able equipment; should not be stored in an area where lead-acid batteries are stored.
 - 1. A

 - 2. C 3. D 4. F
- 1-25. Commonly called mercury cells; small and powerful; should not be 1-32. exposed to heat over 400 degrees F.

 - 1. A 2. B 3. D 4. E
- 1-26. Most widely used wet-cell battery; battery gases are extremely explosive; contains sulfuric acid.
 - 1. B

 - 2. C 3. D 4. F
- 1-27. Has high energy; is long lasting; could release toxic gases or explode.

 - 1. A 2. B
 - 3. C
- Commonly called an alkaline 1-28. battery; used in portable radios; safety precautions same as for 1-35. carbon-zinc batteries.

 - 2. C
 - 3. E
- 1-29. Most common battery in the Navy; could explode if put into a fire.
 - 1. A
 - 2. D
 - 3. E
 - 4. F

- IN ANSWERING QUESTIONS 1-24 THROUGH 1-29, 1-30. What group is responsible for the proper stowage of hazardous material in an area under their cognizance on board ships?

 - The supply department
 Individual work center personnel
 - 3. Both 1 and 2 above
 - 1-31. You should never remove a cathoderay tube unless its high voltage anode has been charged.

 - 1. True 2. False
 - The form and appearance of PCBs can range from oily liquids to crystalline solids.
 - 1. True
 - 2. False
 - 1-33. All hazardous material and hazardous material containers do not have to be labeled.
 - 1. True
 - 2. False
 - 1 34. If you dispense a hazardous material into an unlabeled container, what must you do?
 - 1. Place a large red "X" on the outside of the container
 2. Use all of the dispensed
 - material within 1 hour and then dispose of the container
 - 3. Both 1 and 2 above
 - 4. Indicate on the new container the same label information shown on the original container
 - Which of the following items must manufacturers of hazardous materials provide for users?
 - Information sheets on all hazardous materials they produce
 - 2. A material safety data sheet (MSDS) to the user for each hazardous material
 - 3. Both 1 and 2 above
 - 4. Protective clothing
 - Where are the MSDSs for a work center located at shore stations?

 - At the main supply center
 Within the work center
 The Safety Officer's files
 - 4. At public works

- 1-37. What is the background color of 1-44. Which of the following is a label the DOT hazardous material shipping symbols for non-flammable gas?

 - 1. Red 2. Orange
 - 3. Yellow
 - 4. Green
- 1-38. You have the authority to relabel properly labeled hazardous material.
 - 1. True
 - 2. False
- 1 39. Which of the following actions should you take when using hazardous solvents?
 - 1. Spray solvents on electrical

 - ventilation
 4. Place all rags used with the solvents in an open container outside of the workspace
- Which types of solvents are the 1-40. safest?
 - 1. Oil-based
 - 2. Petrolatum-based
 - 3. Ammonia-based
 - 4. Water-based
- 1-41. What should you do before using an aerosol container?

 - 3. Point the can away from you and test it
 - 4. Remove the label
- Which of the following information is contained on an MSDS?
 - information 2. Transportation data

 - Transportation data
 An emergency phone number
 - 4. All of the above
- 1-43. All equipment and cabinets 1-50. containing in-service PCB label similar to the one shown in figure 2-3 of the text. capacitors must be marked with a
 - 1. True
 - 2. False

- used by the Navy on hazardous material?
 - 1. Department of Defense Hazardous Chemical Warning
 - 2. Supply Corps Identification Label
 - 3. Department of the Navy Identification Label
 - 4. Supply Department Hazardous Warning Label
- 1-45. In which section of the Tag-Out Log will you find DANGER/CAUTION tag-out record sheets that have been cleared and are no longer in effect?

 - 1. 2 2. 3 3. 4
- windings only

 2. Apply cleaning solvents to heated elements only

 3. Ensure there is adequate

 1-46. The instrument log is found in which section of the Tag-Out Lo which section of the Tag-Out Log?
 - 1. 1

 - 2. 2 3. 3 4. 4
 - 1-47. DANGER/CAUTION tag-out record sheets that are still in effect are kept in which section of the Taq-Out Loq?
 - 1. 1 2. 2 3. 3 4. 5
- 1. Clear the area of all personnel 1-48. Which of the following is the greatest hazard associated with greatest hazard associated with working aloft?

 - The danger of a fall
 The dropping of objects
 Radiation burns
 Asphyxiation
- 1. Ingredients and identity 1-49. An RF burn is the result of RF voltages passing through the body.

 - 1. True 2. False
 - Which of the following is the best basic description of a laser beam?
 - 1. A concentrated beam of infrared light
 - 2. A concentrated beam of medical X-rays
 - 3. A concentrated beam of optical radiation
 - 4. A concentrated beam of electricity

- When removing or replacing an ESDS $\,$ IN ANSWERING QUESTION 1-56, REFER TO device, which of the following $\,$ TABLE 3-1 OF THE TEXT. 1-51. actions should you take?
 - Ensure that you are grounded
 - Move around, so you don't build up a static charge
 - 3. Hold the device through electrostatic-free wrap if possible
 - 4. Both 1 and 3 above
- 1-52. energized.
 - 1. True
 - 2. False
- 1-53. should take if you see someone being shocked?
 - Call for medical personnel
 Secure the area

 - 3. Remove the victim from the live circuit
 - 4. Secure the power
- Information on equipment grounding can be found in which of the 1-54. following publications?
 - NAVEDTRA 12052
 - 2. SECNAVINST 5216.5C
 - 3. MIL-STD-1310
 - 4. SPCCINST 4441.170
- 1-55. How much time, in seconds, is required for 44 milliamperes to cause your heart to begin fibrillation?
 - 1. 3

 - 2. 7 3. 14 4. 30

- volts, you should attach the test probe while the equipment is decharge enters the body.

1-56. What is the "can't let go" current

weighing 175 pounds?

in milliamperes for a person

1. True

1. 10.0 2. 16.0

3. 18.0

4. 65.0

- 2. False
- What is the first action that you 1-58. What is the resistance, in ohms, between major extremities of an average human body?
 - 1. 500
 - 2. 1000
 - 3. 1500
 - 4. 2000
 - 1-59. Of the following, which is the most dangerous path current can take through the body?
 - Hand to hand
 - 2. Left hand to either foot
 - 3. Right hand to either foot
 - 4. Foot to foot
 - 1-60. Which of the following factors cause(s) electric shock?
 - Current
 Voltage

 - 3. Low body resistance
 - 4. Both 2 and 3 above
 - 1-61. When personnel work aloft, a verbal warning must be passed over the 1MC prior to commencement of the work and at what time intervals, in minutes, until the work is completed?
 - 1. 5

 - 2. 10 3. 15 4. 20
 - 1-62. Whose permission is required to work aloft?
 - Officer of the Deck
 Commanding officer
 Operations officer
 Engineer officer

- 1-63. Only qualified ship's force personnel may perform the second check of tag installation.
 - 1. True
 - 2. False
- The number "70" in tag number 1-64. 70-16 represents which of the following information?
 - The last two digits of the Julian date
 - The log serial number
 - 2. The log serial 3. The tag number

- 1-65. When tag requirements have been identified and the affected system will be rendered out-of-commission as a result of the tag-out, the authorizing officer must obtain permission from which of the following individuals prior to effecting the tag-out?
 - 1.
 - 2.
 - Commanding officer
 Operations officer
 Cognizant Department head
 Both 1 and 3 above 3.
 - 4.

STUDENT COMMENT SHEET

THIS FORM MAY BE USED TO SUGGEST IMPROVEMENTS, REPORT COURSE ERRORS, OR TO REQUEST HELP IF YOU HAVE DIFFICULTY COMPLETING THE COURSE.

NOTE: IF YOU HAVE NO COMMENTS, YOU DO NOT HAVE TO SUBMIT THIS FORM.

FROM:	Date
RATE/RANK/GRADE, NAME (FIRST, M.I., LAST)	DSN:
STREET ADDRESS, APT #	Commercial:FAX:
CITY, STATE, ZIP CODE	
To: COMMANDING OFFICER NETPDTC CODE N315 6490 SAUFLEY FIELD RD PENSACOLA FL 32509-5237	

Subj: ELECTRONICS TECHNICIAN—VOLUME 1, SAFETY, NAVEDTRA 12411-A

1. The following comments are hereby submitted:

PRIVACY ACT STATEMENT

Under authority of Title 5, USC 301, information regarding your military status is requested to assist in processing your comments and in preparing a reply. This information will not be divulged without written authorization to anyone other than those within DOD for official use in determining performance.

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DEPARTMENT OF THE NAVY

COMMANDING OFFICER NETPDTC CODE N315 6490 SAUFLEY FIELD RD PENSACOLA FL 32509-5237

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